

1 What is claimed is:

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2. A method for applying multi-resolution boundary encoding to region based still image and video encoding, comprising:

4 dividing an original image into a plurality of regions, wherein a plurality of boundaries associated with the plurality of the regions is detected;

6 encoding each of the plurality of the boundaries, whereby each of the plurality of the boundaries contains different resolution coefficients;

8 decomposing each of the plurality of the regions in the original image into one or more subbands using the plurality of the boundaries with the highest resolution coefficients;

10 successively decomposing each of the plurality of the regions in a subband with lower resolution coefficients into one or more subbands using the plurality of the boundaries with lower resolution coefficients;

13 transmitting boundary and image information with the lowest resolution coefficients; and

14 successively transmitting boundary and image information with higher resolution coefficients.

16 2. The method of claim 1, wherein the encoding step includes encoding each of the plurality of the boundaries by two periodic wavelet series, whereby each of the plurality of the boundaries contains different resolution coefficients in each of the two periodic wavelet series.

18 3. The method of claim 1, wherein the decomposing step includes decomposing each of the plurality of the regions in the original image into four subbands using a region based subband encoding scheme.

20 4. The method of claim 3, wherein the decomposing step includes decomposing each of the plurality of the regions in the original image into a subband using low pass horizontal and low pass vertical frequency filters.

22 5. The method of claim 3, wherein the decomposing step includes decomposing each of the plurality of the regions in the original image into a subband using high pass horizontal and low pass vertical frequency filters.

24 6. The method of claim 3, wherein the decomposing step includes decomposing each of the plurality of the regions in the original image into a subband using low pass horizontal and high pass vertical frequency filters.

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- 1 7. The method of claim 3, wherein the decomposing step includes decomposing each of the  
2 plurality of the regions in the original image into a subband using high pass horizontal and high pass  
3 vertical frequency filters.
- 4 8. The method of claim 1, wherein the successively decomposing step includes successively  
5 decomposing for at least three levels of decomposition.
- 6 9. The method of claim 1, further comprising reconstructing image information at a higher  
7 resolution in a receiver by combining the image information in the one or more lowest resolution  
8 subbands.
- 9 10. The method of claim 9, further comprising successively reconstructing image information  
10 at a yet higher resolution in the receiver by combining the image information in the one or more  
11 lower resolution subbands, until the original image is reconstructed.
- 12 11. An apparatus for applying multi-resolution boundary encoding to region based still image  
13 and video encoding, comprising:  
14 means for dividing an original image into a plurality of regions, wherein a plurality of  
15 boundaries associated with the plurality of the regions is detected;  
16 means for encoding each of the plurality of the boundaries, whereby each of the plurality  
17 of the boundaries contains different resolution coefficients;  
18 means for decomposing each of the plurality of the regions in the original image into one or  
19 more subbands using the plurality of the boundaries with the highest resolution coefficients;  
20 means for successively decomposing each of the plurality of the regions in a subband with  
21 lower resolution coefficients into one or more subbands using the plurality of the boundaries with  
22 lower resolution coefficients;  
23 means for transmitting boundary and image information with the lowest resolution  
24 coefficients; and  
25 means for successively transmitting boundary and image information with higher resolution  
26 coefficients.
- 27 12. The apparatus of claim 11, wherein the means for encoding step includes means for  
28 encoding each of the plurality of the boundaries by two periodic wavelet series, whereby each of  
29 the plurality of the boundaries contains different resolution coefficients in each of the two periodic  
30 wavelet series.

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- 1 13. The apparatus of claim 11, wherein the means for decomposing step includes means for  
2 decomposing each of the plurality of the regions in the original image into four subbands using a  
3 region based subband encoding scheme.
- 4 14. A computer readable medium providing instructions for applying multi-resolution boundary  
5 encoding to region based still image and video encoding, the instructions comprising:  
6 dividing an original image into a plurality of regions, wherein a plurality of boundaries  
7 associated with the plurality of the regions is detected;  
8 encoding each of the plurality of the boundaries, whereby each of the plurality of the  
9 boundaries contains different resolution coefficients;  
10 decomposing each of the plurality of the regions in the original image into one or more  
11 subbands using the plurality of the boundaries with the highest resolution coefficients;  
12 successively decomposing each of the plurality of the regions in a subband with lower  
13 resolution coefficients into one or more subbands using the plurality of the boundaries with lower  
14 resolution coefficients;  
15 transmitting boundary and image information with the lowest resolution coefficients; and  
16 successively transmitting boundary and image information with higher resolution coefficients.
- 17 15. The computer readable medium of claim 14, wherein the instructions for encoding step  
18 includes encoding each of the plurality of the boundaries by two periodic wavelet series, whereby  
19 each of the plurality of the boundaries contains different resolution coefficients in each of the two  
20 periodic wavelet series.
- 21 16. The computer readable medium of claim 14, wherein the instructions for decomposing step  
22 includes decomposing each of the plurality of the regions in the original image into four subbands  
23 using a region based subband encoding scheme.
- 24 17. The computer readable medium of claim 16, wherein the instructions for the decomposing  
25 step includes decomposing each of the plurality of the regions in the original image into a subband  
26 using low pass horizontal and low pass vertical frequency filters.
- 27 18. The computer readable medium of claim 16, wherein the instructions for the decomposing  
28 step includes decomposing each of the plurality of the regions in the original image into a subband  
29 using high pass horizontal and low pass vertical frequency filters.

1 19. The computer readable medium of claim 16, wherein the instructions for the decomposing  
2 step includes decomposing each of the plurality of the regions in the original image into a subband  
3 using low pass horizontal and high pass vertical frequency filters.

4 20. The computer readable medium of claim 16, wherein the instructions for the decomposing  
5 step includes decomposing each of the plurality of the regions in the original image into a subband  
6 using high pass horizontal and high pass vertical frequency filters.

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